REMARKS

Claims 1-3, 5, 7-10, 14 and 18-29 are pending in this application.
Claims 5, 7-10, 19, 22 and 26-29
Claims 1-3, 14, 18, 20-21, and 23-25 are rejected.

The office action dated September 9, 2004 indicates that independent claims 1, 18 and 21 are rejected under 35 USC §102 (e) as being anticipated by Bhaskar U.S. Patent No. 6,393,148. These rejections are respectfully traversed.

Claim 1 has been amended for clarity, not in response to the '102 rejection. Amended claim 1 recites a method of processing a pixel of a digital image. The method includes applying a tone mapping function to a first color channel of the pixel, the first color channel most closely matching relative luminance response of the human visual system; computing scale factors for other channels of the pixel; and applying the scale factors to the other color channels of the pixel. The scale factors are computed according to fixed offset values and values of the first color channel before and after the tone mapping function is applied. The fixed values offset the effect of noise in calculating the scale factors.

Bhaskar discloses a contrast enhancement method. Histograms of each color channel of an image are generated, and statistics are derived from the histograms (see col. 4, lines 28-34 and lines 56-64). From these statistics, a lookup table is generated (col. 8, lines 34-37). The lookup table is applied to each pixel in the image to enhance tone level (see col. 8, lines 59-60).

Bhaskar's method will now be described in greater detail. Referring to Figure 4, the histograms and statistics are computed at blocks 42 and 48. At

blocks 50-56 an overall stretch factors is computed. A predefined factor is reduced according to maximum saturation value in the image (col. 5, lines 55-56).

At blocks 58 and 60, it is determined whether the image is saturated at a tone level. Minimum and maximum luminance factors are determined according to whether the image is saturated (block 61 or 62). These minimum and maximum factors will be used to determine the overall stretching factor (see col. 6, lines 51-54).

At block 66, a color weighting factor is computed for each color. The color weighting factor of a color is a function of the difference between (1) standard deviation of the tone level for luminance and (2) the standard deviation of the tone levels for the color (see equation 3). The color weighting factors are used to adjust the amount of stretching of the dynamic range for each color based on each RGB channel's standard deviation (col. 6. lines 60-63).

Blocks 68 and 72 determine whether a full dynamic range stretch is performed. If the image has sufficient contrast, the image is not enhanced. (blocks 68 and 70). The amount of stretching can be limited if the image is saturated at one of the extreme tone levels of a color (blocks 72 and 74)

If a full dynamic range stretch is desired, an overall stretch factor is computed at block 76.As shown in equation 5, the stretch factor is a function of luminance statistics and the minimum and maximum luminance stretch factors.

At block 78, a lookup table is created. The table is created from the overall stretch factor, the color weighting factors and anchor factors (col. 8, lines 34-37). Each anchor factor ensures that the stretching occurs about the mean of a color (col. 8, lines 37-41).

At block 80, the lookup table is used to enhance tone levels of the image. The lookup table is applied to each pixel (col. 8, lines 59-60) .

Bhaskar does not apply a tone mapping function to a first color channel, and then use the results of the tone mapping to compute scale factors for the other channels. Bhaskar computes the scale factors in the lookup table for all of the channels prior to applying any of the scale factors. The scale factors are applied at block 80, which is the last block of Figure 4.

The scale factors applied to the other channels of a pixel are not based on a change in value of the first color channel. The scale factors are based on an overall stretching factor, color weight terms and anchor factors.

As noted in the office action, Bhaskar uses the luminance channel to generate the lookup table. However, Bhaskar does not apply a tone mapping function directly to the luminance channel. The luminance values are affected as a result of stretching the RGB channels (see col. 6, lines 54-56). Therefore, the office action is incorrect when it states that "factors are applied to all channels including the luminance channel."

Thus, Bhaskar does not teach a method having all of the limitations of claim 1. Therefore, the '102 rejection of claim 1 and its dependent claims 2-3, 5 and 7-10 should be withdrawn.

The Bhaskar patent cannot be used in a '103 because it is a '102(e) reference and it is owned by the owner of the present application (Hewlett-Packard). Therefore, claims 1-3, 5 and 7-10 should be allowed over Bhaskar alone.

Claim 18 recites apparatus for processing pixels of a digital image. The apparatus comprises a processor for applying a tone mapping function to a first color channel of the pixels, computing scale factors for other channels of the pixels, and applying the scale factors to the other color channels of the pixels. The scale factors are computed according to noise balancing terms and changes in values of the first color channel. The first color channel most closely matches relative luminance response of the human visual system. Claim 18 and its dependent claims 14, 19-20, 24 and 26-27 should be allowed over Bhaskar for the reasons above.

Claim 21 has been amended for clarity, not in response to the '102 rejection. Amended claim 21 and its dependent claims 22-23, 25 and 28-29 should be allowed over Bhaskar for the reasons above.

Claim 5 has been amended to overcome an objection. Claim 7 has been amended to correct a typographical error.

The examiner is respectfully requested to issue a notice of allowability. If any issues remain, the examiner is invited to contact the undersigned to discuss those remaining issues.